REMARKS

This paper is submitted in reply to the Office Action dated September 8, 2004, within the three-month period for response. Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 1-28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0 772 126 A2 to Matena in view of U.S. Patent No. 6,014,669 to Slaughter et al.

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have canceled claim 8 and amended claims 1, 3, 9, 12, 17, 20 and 26-27. Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed.

Now turning to the Office Action, and initially to the rejection of claim 3, this claim recites a method of performing a resource action in a clustered computer system of the type including a plurality of resources and a plurality of cluster entities configured to own the plurality of resources. The recited method includes preparing the clustered computer system prior to performing the resource action by modifying at least one cluster configuration parameter associated with the plurality of cluster entities in the clustered computer system such that any cluster entity that is active during preparation of the clustered computer system accepts the modification to the cluster configuration parameter, and such that any cluster entity that is inactive during preparation of the clustered computer system does not accept the modification to the cluster configuration parameter.

Claim 3 has now been amended to additionally recite that each of the plurality of resources is configured to be owned by at most one of the plurality of cluster entities at a time, and furthermore, to recite the step of performing a resource action that changes the ownership of at least one of the plurality of resources after preparing the clustered

computer system. Furthermore, claim 3 as amended now recites that any inactive cluster entity is thereafter blocked from being accepted into the clustered computer system and causing a resource conflict resulting from the change in ownership of the at least one of the plurality of resources. In connection with these amendments, claim 8 has been canceled, and claims 9 and 12 have been amended to depend from claim 3.

The invention of claim 3 addresses a problem that arises in a clustered computer system due to a scenario such as is described in the specification, e.g., on pp. 2 and 3, where a risk exists whenever resources are transferred between nodes and other entities in a cluster that such resources may be lost during the transfer. Specifically, certain resources in a clustered computer system are required to be owned by at most one cluster entity at a time, and to ensure this condition is met, one entity that owns a resource is required to release its ownership prior to another entity taking ownership of the resource. (p. 2, lines 22-29). As an example, virtual memory address ranges are one type of resource that only one entity should be allowed to own at any given time. Otherwise, with two entities claiming ownership, one entity could attempt to modify memory addressed at a virtual memory address range being used by another entity.

The requirement of only one entity owning a resource at a given time raises a concern that a failure occurring between the time that one entity releases ownership and another entity takes over ownership could result in that resource being lost, i.e., not owned by any entity. When a resource is lost, the resource typically becomes unusable by the system unless recovered. One manner of recovering a resource is referred to in the specification as a type of resource action known as a resource recovery action, and which operates by querying the cluster for the ownership of each known object, and then claiming ownership of each unclaimed resource.

One concern that arises in connection with a resource recovery action, however, is that the claiming of a resource that was once owned by another entity that has become inaccessible to the cluster could still be considered "owned" by that other entity. As such,

were the other entity to be able to access the cluster, the claimed resource could be considered to be owned by more than one entity, which creates what is referred to as a resource conflict.

Another type of resource action that may be supported in some embodiments consistent with claim 3 is a resource transfer action that transfers ownership from one entity to another. Of note, as with a resource recovery action, a resource transfer action results in the ownership of a resource being changed in some fashion. Likewise, a similar risk exists that another entity might later become accessible to a cluster and create a resource conflict with the resource for which ownership has been transferred.

Claim 3 addresses these concerns through the use of the claimed prepare step whereby a cluster configuration parameter is modified for a plurality of active cluster entities, but not for an inactive cluster entity, to in effect block the inactive cluster entity from later being accepted into the clustered computer system. Furthermore, from the perspective of maintaining proper ownership of resources, claim 3 has been amended to more clearly focus on the nature of a resource as being owned by at most one entity at a time, and on the nature of a resource action as changing the ownership of a resource (e.g., by transferring ownership from one entity to another, or by claiming ownership of an unowned resource). Claim 3 has also been amended to clarify that any inactive cluster entity is thereafter blocked from causing a resource conflict resulting from the change in ownership. Support for these amendments may be found, for example, at pp. 2-4 of the specification as filed.

In rejecting claim 3, the Examiner relies on the combination of Matena and Slaughter. Matena, however, does not address the concept of "ownership" as is presently claimed, particularly in the context of resources being owned by at most one entity at a time, and in connection with performing resource actions that change ownership.

It appears that the Examiner takes a rather broad reading of ownership to cover any entity that is capable of accessing a resource. Indeed, the Examiner states in ¶3 of the

Office Action that, with respect to Matena, "[a] resource action is any access of the shared disk resource 120 by any of the nodes A-D." However, accessing a resource, and owning a resource, are recognized in the art as two separate concepts.

In addition, claim 3 now recites a resource action that specifically changes the ownership of a resource. Accesses to a disk resource, however, do not change the ownership of that resource, and as such, Matena fails to disclose a resource action as presently claimed. Furthermore, the various activities in Matena that the Examiner analogizes to Applicants' claimed features relating to updating a cluster configuration parameter only address locking out a node from the perspective of membership in a cluster, and ultimately, access to a resource in the cluster. The reference falls short of disclosing a prepare step performed in connection with a resource action that changes ownership of a resource that is owned by at most one cluster entity.

Claim 3 also recites the concept of blocking an inactive cluster entity from causing a resource conflict resulting from the change in ownership. As noted above, and as in the specification as filed, a resource conflict within the context of the invention could occur if two entities claim ownership of the same resource at the same time. Matena does not address such a concern, and indeed, taking the Examiner's position that "access" to a resource is analogous to ownership, Matena specifically allows multiple entities to access the same resource at the same time.

Slaughter, moreover, does not rectify the shortcomings of Matena. Slaughter is cited merely for disclosing a lock obtained in connection with a membership change in a cluster. There is no disclosure in the reference of blocking an inactive cluster entity from causing a resource conflict resulting from a change in ownership of a resource constrained to being owned by at most one cluster entity.

Applicants also respectfully submit that neither Matena, Slaughter nor any other prior art of record, suggests modifying Matena to incorporate the functionality recited in claim 3. None of the art of record appreciates the specific concern of blocking inactive

cluster entities from later causing resource conflicts after a resource action is performed to change the ownership of a resource that is permitted to have at most one owner at a time. Accordingly, Applicants submit that claim 3 is non-obvious over the combination of Matena and Slaughter. Reconsideration and allowance of claim 3, and of claims 4-7 and 9-16 which depend therefrom, are therefore respectfully requested.

Next, with respect to independent claims 1, 17, 26 and 27, while the subject matter of each of these claims differs in many respects, each claim has been amended to recite in part the concepts of performing a resource action that changes the ownership of a resource that is capable of being owned by at most one cluster entity at a time, and modifying a cluster communication parameter in preparation for the resource action to effectively block any inactive node from being accepted into the clustered computer system after modification of the node configuration parameter and causing a resource conflict resulting from the change in ownership of the resource.[1] As noted above in connection with claim 3, this combination of features is not disclosed or suggested by the combination of Matena and Slaughter, and accordingly, these claims are non-obvious over this combination of references. Reconsideration and allowance of claims 1, 17, 26 and 27, as well as of claims 2, 18-25 and 28 which depend therefrom, are therefore respectfully requested.

As a final matter, Applicants traverse the Examiner's rejections of the dependent claims based upon their dependency on the aforementioned independent claims. It should be noted, however, that a number of these claims recite additional features that further distinguish the claims from the prior art of record, e.g., the variations for a cluster communication parameter (claims 4-7 and 19), the specifics of a resource recovery action (claims 9-11 and 20), the specifics of value pairs (claims 14 and 23), and detecting

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[1]Of note, claim 20 has also been amended to correct a minor inconsistency in the claim.

missing cluster entities (claims 16 and 25). In the interest of prosecutorial economy, however, these claims will not be addressed in greater detail herein.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

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